

2.6. Translation Philosophy: The X-Ray Method

To settle on our list of translation variations – to establish, e.g., that “but” and “though” should be translated the same as “and” – we appealed to facts about meaning (and related notions of truth and validity). But having now fixed the list of translation variations, we will proceed to apply them in translation in a purely automatic way: replacing each English form phrase with its formal counterpart without thinking twice (or even once) about what those English terms mean. So for every negation phrase we encounter (“not,” “n’t,” “im-,” ...), we *automatically* replace it with a tilde; and likewise with each conjunction and disjunction phrase.

We might call this the ‘auto-pilot’ approach to translating form phrases, but I prefer the label “**x-ray translation method**”. Since the logical form of a sentence is its underlying skeleton, each form phrase is like one bone in that skeleton. And an accurate x-ray is one that automatically and faithfully mirrors each bone being pictured – without bothering to consider whether all the bones are important, or what they’re for. (Those latter questions might be raised by the doctor looking at the x-ray; but the job of the x-ray device itself is not to worry about such things – only to faithfully image every detail of the skeleton.)

The point of the x-ray metaphor becomes clear when we translate sentences with multiple form phrases. The following sentence, for instance, contains two negation phrases – “not” and “im-” – and one subject matter sentence, “It is possible to pass Logic”.

P: It’s possible to pass Logic

It’s ~~not~~ ~~im~~possible to pass Logic.

Automatically replacing each negation phrase with a tilde yields the following translation.

~~P

But here some will find the x-ray approach unattractive. For many people will instinctively want to ‘cancel out’ the two negation phrases, and translate

the English sentence simply as “P”. And the justification is equally instinctive: after all, they say, the sentence “It’s not impossible to pass Logic” **means the same** as “It’s possible to pass Logic”.

I suppose it’s true that that the two sentences mean the same thing. But note what our critic does in resisting the x-ray approach: he introduces questions of *meaning* into the translation of (multiple) form phrases. On the critic’s alternative approach, we need to ask of the original sentence if there’s a simpler English sentence meaning the same thing; and if there is, we instead translate that simpler sentence into the formal language.

While that strategy might feel natural, the heavy cost it brings is hidden by the simplicity of the above example. It’s easy enough to ‘cancel out’ a double negation in our heads, without pencil or paper. But what are simpler versions of these English sentences?

Either Jake and Rex won’t both fail to attend the meeting, or
Kitty won’t fail to attend.

It is not the case that either Suki or Neko will fail to be
irresponsible, but Jack will.

There *are* simpler versions, but we wrack our brains to come up with them. And here we recognize a familiar problem: though English meanings are just the sort of things we can juggle in our heads intuitively, those intuitive powers are quickly overwhelmed by **complexity**. That, of course, was exactly the problem that led us to develop the formal approach to logic (beginning with translation into formal language). But by dragging judgments about sameness-of-meaning into the translation procedure, and forcing us to settle complex questions of English meaning *before* we move to the formal language, our critic inflicts the problem of complexity on us all over again – before the formal method has a chance to work its magic. Our attempt to overcome mind-boggling complexity will then have moved in a decidedly vicious circle.

That’s why we resist the critic’s call to stop and think about the *meanings* of combinations of form phrases. Instead, with the list of translation variations in hand, we automatically replace each English form phrase with its formal counterpart, never stopping to think what it means, or whether there’s a simpler English way of combining it with its neighbors. If an x-ray

encounters two bones (or four, or ten), it faithfully records each without reflecting on the purpose of them, or whether a simpler skeleton is possible; and our x-ray translation approach proceeds likewise.

Therein lies the different translation approaches, mentioned earlier, for **subject matter sentences** and **form phrases**. With pairs of subject matter sentences we do need to stop and ask whether they mean the same thing. We can't build a list in advance that will handle every possible subject matter sentence; so there questions of meaning cannot be avoided. By contrast, our pre-established list of translation variations renders translation of form phrases quite brainless and automatic. And that automatic aspect is just what will rescue the formal test of validity from overwhelming complexity.

Even with these strategic advantages in mind, however, the x-ray translation method might still seem to overlook important facts about meaning – that, for example, a double negation *means the same* as its ‘cancelled out’ cousin. But we'll see that in fact we overlook nothing: for all its automatic qualities, the x-ray approach does faithfully encode the logical meaning of the sentence. Our trick will be to assign the task of *recognizing* that meaning to another actor in our formal test. This division of labor allows translation into the formal language which neither boggles our intuitions, nor loses information about the meaning of the English original.